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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/15/2004

Robert Lewis Clarke

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EXAMINER

BEST, ZACHARY P

ART UNIT

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1795

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/518,041	<b>Applicant(s)</b> CLARKE, ROBERT LEWIS	
	<b>Examiner</b> Zachary Best	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 12-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10162008</u> .  | 6) <input type="checkbox"/> Other: _____                          |

**ZINC AIR BATTERY WITH ACID ELECTROLYTE**

Examiner: Z. Best    S.N. 10/518,041    Art Unit: 1795    November 20, 2008

***Continued Examination Under 37 CFR 1.114***

1.     A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 15, 2008 has been entered. Claims 1 and 5 were amended. Claims 21-24 were newly added.

2.     The text of sections of Title 35 U.S.C. not included in this action can be found in the prior Office Actions issued on February 21, 2008 and July 18, 2008.

***Election/Restrictions***

3.     Newly submitted Claims 21-24 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the subject matter of Claims 21-24 is “a zinc-air secondary battery comprising an acid electrolyte that further includes a compound... wherein the compound is present in the electrolyte at a concentration effective to provide acidity to the electrolyte and to reduce dendrite formation zinc during charging,” which is a distinct species from “a battery comprising an acid

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electrolyte in which oxygen and a dendrite forming metal form a redox pair, wherein acidity of the electrolyte is provided at least in part by a compound that reduces dendrite formation during charging” as recited in the original claims.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, Claims 21-24 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Claim Objections***

4. The claim objection under 37 CFR 1.75(c) of Claim 5 as being of improper dependent form is withdrawn because Claim 5 was amended.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "effective" in Claim 1 is a relative term which renders the claim indefinite. The term "effective" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

***Claim Rejections - 35 USC § 102***

7. The rejections under 35 U.S.C. 102(e) of Claims 1-4 and 8-10 as being anticipated by Clarke et al. (US 2003/0162087 A1) are withdrawn because Claim 1 was amended.

***Claim Rejections - 35 USC § 103***

8. The rejection under 35 U.S.C. 103(a) of Claim 5 as being obvious over Clarke et al. in view of Fleischer et al., Claim 6 of Clarke et al. in view of Awano, Claim 7 of Clark et al. in view of Awano and further in view of Popescu, and Claims 10-11 of Blurton et al. in view of Heinke is withdrawn because Claim 1 was amended.

9. Claims 1-4 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Palmer (US 3,650,837) in view of Clarke et al. (US 7,214,443 B2).

The applied reference Clarke et al. has a common inventor (Robert Clarke) with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

Regarding Claims 1-4, Palmer teaches a secondary metal/air (oxygen and zinc form a redox pair) electrochemical cell (col. 1, lines 4-6) comprising a maintained electrolyte (static, col. 2, line 52) that is acidic (col. 6, lines 74-75). Palmer further teaches a bicell (bipolar) arrangement of the battery (col. 3, lines 14-26) with zinc being the metal forming part of the redox pair (col. 3, lines 36-47). However, Palmer fails to teach said electrolyte further comprises a compound at a concentration effective to provide acidity to the electrolyte and to reduce dendrite formation of the metal during charging.

Clarke et al. teach a battery comprising a zinc half-cell (col. 2, lines 34-39) having an acid electrolyte (col. 2, lines 53-61), wherein the electrolyte contains methane sulfonic acid (col. 9, lines 17-18) in order to reduce dendrite formation (col. 9, lines 37-47). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the secondary battery of Palmer having the electrolyte solution of Clarke et al. because Clarke et al. teach the electrolyte solution containing methane sulfonic acid will reduce dendrite formation.

Regarding Claim 8, Clarke et al. teaches the dendrite-forming metal forms a complex bond with the compound (col. 7, lines 1-3).

Regarding Claim 9, Palmer teaches the dendrite-forming metal is zinc (col. 3, lines 37-47), and Clarke et al. teaches the dendrite-forming metal is zinc and the compound comprises methane sulfonic acid (col. 9, lines 17-18).

Regarding Claim 10, Palmer teaches the cathode is a carbon structure (col. 7, lines 63-66), and Clarke et al. teach the use of glassy carbon as an electrode in a zinc-cell (col. 8, lines 35-57).

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Palmer in view of Clarke et al. as applied to Claims 1-4 and 8-10 above, and further in view of Haranda et al. (US 6,428,928 B1).

Regarding Claim 5, Palmer and Clarke et al. teach the battery as recited in paragraph 9 above. However, Palmer and Clarke et al. fail to teach said compound is selected from the group consisting of polyvinyl sulfonic acid and polyvinyl sulfuric acid.

Haranda et al. teach an electrolyte for an electrochemical cell, which is an aqueous solution (fluid) (col. 8, lines 36-55), and Haranda et al. further teach that methane sulfonic acid and polyvinyl sulfonic acid are used in the electrolyte having sulfonic acid ions (col. 8, lines 36-55). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute polyvinyl sulfonic acid for methane sulfonic acid in the battery of Palmer and Clarke et al. because Haranda et al. teach functional equivalency of polyvinyl sulfonic acid and methane sulfonic acid as a proton conducting material in an electrolyte in an electrochemical cell. Alternatively, simple substitution of one known element for another to obtain predictable results would have been obvious. *See KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Palmer in view of Clarke et al. as applied to Claims 1-4 and 8-10 above, and further in view of Awano (JP 57-101359 A).

Regarding Claim 6, Palmer and Clarke et al. teach the battery as recited in paragraph 9 above. However, Palmer and Clarke et al. fail to teach said battery further comprises a zinc brightener.

Awano teach a battery in which a dendrite-forming metal (zinc) is used as a redox pair, and a brightener for zinc plating (zinc brightener) is used as a dendrite inhibitor (abstract). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the battery of Palmer and Clarke et al. with a zinc brightener because Awano teach the use of the brightener to inhibit zinc dendrite formation.

12. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Palmer in view of Clarke et al. and Awano as applied to Claim 6 above, and further in view of Popescu (US 4,226,682 A).

Palmer, Clarke et al., and Awano teach a battery as recited in paragraph 11 above. However, Palmer, Clarke et al., and Awano fail to teach said compound zinc brightener is from the group consisting of an aromatic monocarboxylic acid, an aromatic aldehyde, and a polyhydric alcohol having ethoxylated or propoxylated hydroxyl groups.

Popescu teach a zinc brightener comprising an aromatic monocarboxylic acid (col. 4, lines 58-63) or aromatic aldehydes (col. 5, line 21). Popescu further teach that the functions



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of the brightener may be better controlled with the above compounds (col. 4, lines 52-57 and col. 5, lines 38-41). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the battery of Palmer, Clarke et al., and Awano with a brightener of an aromatic monocarboxylic acid or aromatic aldehyde because Popescu teach the use of such brightener to enhance the uniformity and brilliance of the zinc deposit. Alternatively, simple substitution of one known element for another to obtain predictable results would have been obvious. *See KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

13. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Palmer in view of Clarke et al. as applied to Claims 1-4 and 8-10 above, and in further view of Heinke (EP 644275 A1).

Palmer and Clarke et al. teach a battery as recited in Paragraph 9 above. However, Palmer and Clarke et al. fail to teach a bipolar electrode comprising a Magnelli phase titanium suboxide.

Regarding Claim 11, Heinke teach an electrode material comprising a Magnelli phase titanium suboxide for use as a bipolar electrode (abstract). Heinke further teach that the electrode as taught creates an essentially even surface for electrochemical purposes (paragraph 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the battery of Palmer and Clarke et al. with an electrode comprising a Magnelli phase titanium suboxide because Heinke teach resultant

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even surfaces for electrochemical purposes. Alternatively, simple substitution of one known element for another to obtain predictable results would have been obvious. *See KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

***Response to Arguments***

14. Applicant's arguments filed on October 15, 2008 have been fully considered, but they are either moot in lieu of the new grounds of rejection necessitated by amendment or not persuasive.

*Applicant argues:*

*(a) Awano teaches against the use of the claimed compound because Awano teaches use of brighteners to inhibit dendrite formation.*

In response to Applicant's arguments:

(a) Awano does teach the use of brighteners in order to inhibit dendrite formation, but the fact that the compound and Awano's use of brighteners both reduce or inhibit dendrite formation does not cause Awano to teach against the use of the compound additionally to reduce further dendrite formation. In other words, Palmer, Clarke et al., and Awano do not positively teach that use of a zinc brightener in addition to the acidic compound will cause the invention to fail.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

zpb

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1795